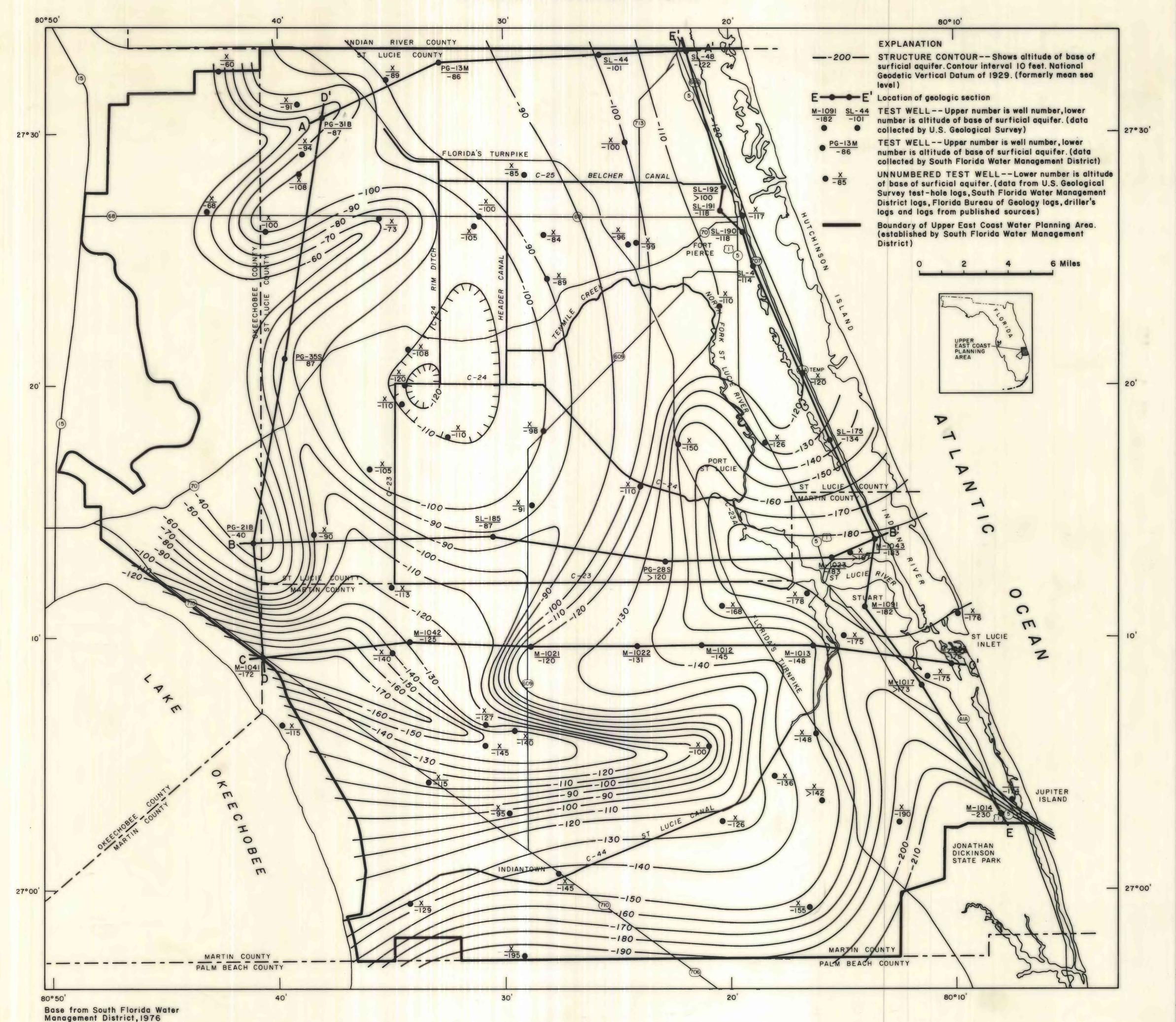
## UPPER EAST COAST PLANNING AREA, LINES OF SECTION, AND ALTITUDE OF BASE OF SURFICIAL AQUIFER



## INTRODUCTION

The Upper East Coast Planning Area, as designated by the South Florida Water Management District, consists of St. Lucie County, Martin County, and eastern Okeechobee County. Land use in the area is primarily agricultural, although urban development along the coast has expanded rapidly in recent years. Population increases, both in urban and agricultural areas, are placing additional demands on the water resources, and long-term planning is required to insure proper management and use of these resources.

The surficial aquifer is the major source of freshwater in the Upper East Coast Planning Area. To evaluate the aquifer and its geologic framework, a cooperative program with the South Florida Water Management District was begun by the U.S. Geological Survey in 1976. The purpose of this report is to display the geologic framework of this aquifer to provide water-management officials with a better understanding of the natural restraints that may be imposed on future development. Lithologic and geophysical logs of 76 wells penetrating the aquifer system were compiled and interpreted for this purpose.

## LITHOLOGY OF THE SURFICIAL AQUIFER AND ITS BASE

The surficial aquifer in the Upper East Coast Planning Area is primarily sand, clay, silt, shell, and limestone deposited during the Pleistocene and Pliocene Epochs. Previous investigations have assigned the sediments forming the aquifer to the Fort Thompson and Anastasia Formations and overlying Pamlico Sand (Pleistocene). Shell and sand lenses in the Caloosahatchee Marl (Pliocene) are also included in the aquifer (Parker and others, 1955, p. 172–76). The lithologic cross sections show the stratigraphy and lithology and indicate complex facies changes which characterize this aquifer. In most of the area the aquifer is unconfined and under water-table conditions. Locally, artesian conditions were noted by Parker and others (1955, p. 176) in the vicinity of Fort Pierce and Indiantown where discontinuous clay lenses act as confining units.

Impermeable and semi-permeable clays and marls (calcareous clays) of the Tamiami and Hawthorn Formations (Miocene) unconformably underlie the surficial aquifer and form its base (Lichtler, 1960, p. 18). Contour lines showing the altitude of the base of the aquifer (relative to the National Geodetic Vertical Datum of 1929) indicate extensive erosion of the Miocene sediments prior to deposition of the aquifer materials. Lithologic logs of wells in the area (Miller, 1979, table 2) show that in some locations, sediments of the Tamiami Formation may have been removed by erosion, and the materials forming the aquifer were deposited directly on the Hawthorn Formation. In other locations in the Upper East Coast Planning Area, lithologic logs indicate that the base of the surficial aquifer is formed by fluvial deposits containing erosional materials from both the Tamiami Formation and the Hawthorn Formation.

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